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Research Note

Paucity of Hematozoa in Peregrine Falcons (*Falco peregrinus*) in West Greenland and Coastal Texas

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ABSTRACT: Two adult gyrfalcons (*Falco rusticolus*) and 8 adult and 95 nestling peregrine falcons (*Falco peregrinus*) from Greenland were hema tozoa free and 2 of 60 adult peregrines from the east Texas coast harbored *Haemoproteus tinnuniculi*.

KEY WORDS: *Falco peregrinus*, *Falco rusticolus*,

Haemoproteus tinnuniculi, *Prosimulium ursinum*, *Aedes impiger*, West Greenland, Texas.

None of the published surveys of hematozoans in peregrine falcons (*Falco peregrinus*) is

based on large sample sizes. Crisp (1854) apparently observed adult filarial worms in cellular tissue "near the heart at the root of the great vessels" in 1 peregrine falcon from Great Britain. Greiner et al. (1975) examined hematozoan literature from North America and reported 6 peregrines as all being negative. Cheke et al. (1976) surveyed a diverse group of British birds for hematozoa and observed *Haemoproteus* spp. in 1 peregrine. Upon postmortem examination of 7 peregrines, Peirce (1980) found 1 with *Haemoproteus* spp. Peirce and Cooper (1977) observed leucocytozoons in 2 of 7 peregrines from Britain. Peirce et al. (1983) showed 1 of 3 peregrines from the United Arab Emirates harboring a microfilaria. Peirce and Marquiss (1983) reported that 25 *F. peregrinus* from Scotland were negative for hematozoa, and Stabler and Holt (1965) observed none in 5 peregrines from Colorado. We examined blood from 8 adult and 95 nestling (12–22 days old) peregrines in West Greenland during the summers of 1991–1993, as well as 60 adults (≥ 2 years old) and immatures (≤ 1 year old) during their spring and fall migration through Padre Island, Texas, in 1994. To our knowledge, this is the first study on hematozoans in *F. peregrinus* with large sample sizes and the first investigation of peregrines during both breeding and migration periods.

As part of wider ecological studies (see Hunt and Ward [1988]; Mattox and Seegar [1988]), adult and nestling peregrines were examined for hematozoa in West Greenland ($66^{\circ}45'N$, $49^{\circ}55'W$) during the summers of 1991–1993. In addition, immature and adult peregrines were trapped during the spring and fall of 1994 and similarly surveyed on the Texas coast ($27^{\circ}10'N$, $97^{\circ}20'W$). Two adult gyrfalcons were also examined in Greenland. Blood samples were taken, fixed in methanol, stained in Giemsa, and examined at $\times 200$, 400, 600, and 1,000 magnification for a minimum of 1 hr as reported by Taft et al. (1996). Adult *Aedes impiger* Walker, 1848 and *Prosimulium ursinum* Edwards, 1935 were collected in Greenland at or near nest sites or directly from nestlings using an aspirator. *Prosimulium ursinum* larvae were also collected from streams throughout the Greenland study area by hand. All specimens were placed in 70% ethanol, and over 100 *P. ursinum* adults and larvae were dehydrated and mounted in Balsam on microscope slides. One voucher specimen of *Haemoproteus tinnuniculi* von Wasielewski and

Walker, 1918 (accession HWML 39029) from a Texas peregrine along with 2 adult *P. ursinum* (HWML 39245), 2 larval *P. ursinum* (HWML 39246), and 2 adult *A. impiger* (HWML 39247) were deposited in the University of Nebraska State Museum, Harold W. Manter Laboratory Collection, Lincoln, Nebraska.

Blood samples collected from 8 adult and 95 nestling peregrines during the summers of 1991–1993 in Greenland, as well as 2 adult gyrfalcons (*Falco rusticolus*), showed no detectable hematozoa.

Of 60 migrating peregrines at Padre Island, Texas, 2 (3%) harbored hematozoans most closely resembling *Haemoproteus tinnunicule* as described by Bennett and Peirce (1988) (an adult female captured on 22 April 1994 and an immature female on 27 September 1994). The former harbored 1 and the latter 2 organisms.

Along with blood samples, over 200 potential hematozoan vectors (*Prosimulium ursinum* and *A. impiger*) were collected in Greenland from eyries, nestlings, and surrounding habitats (streams and ponds), then mounted and identified. At the time, it was thought that if peregrines were infected we would later examine these diptera for hematozoan life cycle stages. According to Crosskey (1990), ornithophily is prevalent in various blackfly groups, but this feeding habit has been little documented in *Austrosimulium* and *Prosimulium* compared to other genera. In this study, we did aspirate feeding *P. ursinum* and *A. impiger* from nestling peregrines.

However, despite the presence of these potential vectors on Greenland nestlings, we were unable to detect hematozoa in peregrines there in the largest breeding season sample yet assembled. According to Wernsdorfer (1980), temperature may be the primary factor limiting the distribution of human malarias to areas south of the $16^{\circ}C$ summer isotherm. Temperatures ranged from 0 – $15^{\circ}C$ in the study area (Mattox and Seegar, 1988) during July and August, and these temperatures may preclude the cycling of avian hemopsporidians as well. However, this does not explain the paucity of hematozoans in migratory peregrines. Only 3% of 60 spring and fall migrant peregrines in Texas were positive for hematozoa. Further, we have readily found hematozoa in other raptors in comparable sample sizes in both breeding (Taft et al., 1994) and migrational seasons (Taft et al., 1996).

These large samples on a half-hemisphere scale at diverse seasons, as well as other above-cited studies of other raptors, suggest that 1 or more ecological, behavioral, genetic, or physiological factors play a role in the general lack of hematozoans in the peregrine falcon.

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